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ABSTRACT

The author calls attention to a basic split between perception and cognition that psychologists or linguists tend to make either explicitly or implicitly. There is some psychological evidence to substantiate, at least for higher developmental levels, the functional importance of this split. The chief problems for psycholinguistics which arise out of it are: how to know when to resist the pressure toward isomorphic descriptions of aspects of language which lie at different places relative to perception/cognition, and how to deal with the relation between development in both kinds of operations and the nature of language development. The author discusses current views and concludes with a list of references. (AMM)

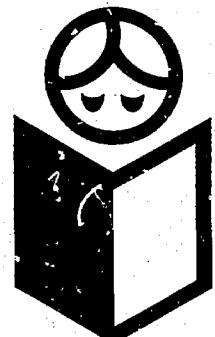
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PERCEPTION VERSUS COGNITION IN LINGUISTIC THEORY AND DEVELOPMENTAL PSYCHOLOGY¹

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A basic conceptual polarity which linguists have used is that between linguistic material--the "stuff" of language--and its meaning. Such a distinction may be found in the terminology of most linguistic theoreticians: Saussure's (1959) decomposition of the linguistic sign into sound-image (significant) and concept (signifie); Jespersen's (1965) correlation of form and notion; Hjelmslev's (1961) polarity between expression and content; Pike's (1954-60) distinction between feature and manifestation modes; and Chomsky's (1966) assertion that linguistics deals with the association between sound and meaning--to give some examples. Once such a distinction is formulated, one tends--despite emphasizing the interdependence of the dyad--to suppose that languages must include some rules (or patterns) which concern the organization of the linguistic material, and some which center around the meaning aspect. This distinction is given concrete expression in the actual organization of linguistic descriptions into phonological and semantic sections.

How does a dichotomy of this type relate to psychological theories? That is, if a speaker of a language is presented with a stretch of language, do his operations on it break down into (at least) two sorts: one having to do with the phonological nature of the stimulus, and the other having to do

¹Paper given at the fourth regional meeting of the Chicago Linguistic Society, April 19th and 20th, 1968.

with its semantic interpretation? Or, in other words, does the performance of the speaker-listener rest on or utilize (at least) two kinds of competence, one phonological and the other semantic? Of course, it just might be the case that linguistic descriptions could be efficiently organized in this way, even if it were not a reflection of how language users actually worked. However, the question of "psychological reality" of the distinction--or, perhaps, its "explanatory adequacy"--is the one discussed in the following pages.

Psychological theorizing does include a dichotomy which seems to parallel the one between linguistic material and meaning; it is the distinction between perception (which specifies "what a stimulus is") and cognition (which determines "what it means"). Thus, if someone tells me that he studied tree-pruning at Oklahoma A & M, I both hear what he said (hearing being a perceptual modality) and know what he talked about (knowledge being the end-product of cognition). Both types of activity may continue for a time after the stretch of language has been encountered; I may "re-play" what the person said, or I may think about it.

This dichotomy, although grossly evident in human self-awareness, has by no means been consistently made in psychology; in fact, schools can be sorted out in terms of their treatment of the distinction (Wohlwill, 1962). Gestalt psychologists favored treating all dealings with stimuli in terms of concepts and principles derived from work on perception, so

that Wertheimer's analysis of syllogistic reasoning talks about the laws of good form. The same tendency is present in the application of "person perception" to areas of social cognition (Tagiuri & Petrullo, 1958). Conversely, Bruner has consistently applied terms from the cognitive realm (such as "hypothesis" and "inference") to his analysis of perceptual phenomena; and Neisser (1967) has entitled "Cognitive Psychology" a book dealing mainly with perception. Both trends represent a playing out of divergent epistemological roles, typified respectively by empiricists like Locke and Hume, the latter of whom said that to judge that the sun is shining is to vividly picture the shining sun; and by rationalists like Leibniz and Spinoza, the latter of whom said that seeing something happen is a mental operation analogous to drawing a conclusion.

The mainstream of American behaviorism has not made any major distinctions in the area. Osgood's early discussion (Osgood & Sebeok, 1954:127) of the learning of meaning portrays it as "inseparable" from the development of perception, since both are held to involve classical conditioning. Skinner's (1953) position would I believe imply that discrimination and differentiation can apply to stimuli or responses on the basis of any characteristics. Surprisingly enough, the same lack of distinction is implied in Lenneberg's (1967) extended application of the concept of "transformation" to seeing Necker cubes and naming, as well as dealing with ambiguous sentences.

Such confusion might make one suspicious that the material which textbook chapters divide into perception and cognition may be fundamentally the same, so that it might better be lumped together, using any label one happens to prefer. This feeling grows when one realizes that for any basic intellectual content--e.g., space, causality, emotion--the ordinary judgments of an adult may involve weighted combinations of various perceptual and cognitive evidence. If a subject is presented with a coin and asked how big it is, his response will be influenced by what he "knows" about the size of such objects, as well as how big it "looks." Furthermore, the products or results of perception and cognition share a great many features: both involve "coding," produce categories (percepts versus concepts), maintain invariance over change in irrelevant object attributes (constancy versus conservation), are susceptible to "set," can be "satiated," store operations and products, and so forth. Such similarities as these have led Heinz Werner (1948:213-216) to refer to perception and cognition as "analogous processes," which do in fact lead to the same sorts of achievements. In a parallel way, moving about may be accomplished by crawling, walking, driving, riding a bicycle, or many other ways; and in each case one may speak of distance covered, speed, obstacles, etc.

However, also involved in the notion of analogous processes is the stipulation that the means of attaining the results involves different

function patterns. This is obviously true in the case of the means of locomotion just mentioned. But is there reason to think that perception and cognition actually differ in the way they operate? Egon Brunswik (1956:89-99) has pointed out certain very evident properties which lead one to reconsider lumping the two together. He gave people the task of determining how big a square patch presented to them was--one group, the perceptual one, by looking at it and saying how big it appeared; another group, the cognitive one, by using a formula to calculate size from data on distance and retinal area covered by the image of the patch. The perceptual group, while they seldom got the size exactly correct, were never far off. On the other hand, the cognitive group were overwhelmingly right to the inch--except for a few who made errors, which led in some cases to fantastically wrong answers. Brunswik concludes that perception is devised, via evolution, to contain safeguards which ensure its usually being "about right," operating by the parallel processing of many interlocking, probabilistically weighted cues; whereas cognition typically operates along serial "paths" which lead to points which are either quite strikingly right--or wrong.

Also indicative of possible differences is a long line of reaction time studies (cf. Woodsworth & Schlosberg, 1954:ch. 2). The task the subject has to perform with respect to the stimulus definitely affects the time of exposure he needs or the time he takes before responding; and

the more obviously "cognitive" tasks take longer than ones that seem more "perceptual." A recent example is Oldfield's (1966) study, in which he presented a picture and either asked the subject to name the object portrayed or asked him to tell whether it was the same or different than another picture. Not only does it take longer, in general, to give names than to judge perceptual identity; but latency in the naming task increases with rarity of the name in the language, whereas latency on the perceptual task does not.

The most extensive set of proposals regarding the perception-cognition distinction has been made by Jean Piaget (1950:ch. III; Piaget & Morf, 1958). The operations involved in perception, in his formulation, never attain the mobility and flexibility of operational thought. The very patternedness of perceptual Gestalts, which is so prominent, may be seen as a result of this interdependence between components of perceptual acts. Such components of perception, whether simultaneous or serial, have an effect on each other which leads perception to be relative in a unique and distorting sense. For example, Piaget cites lack of reversibility--a percept, once attained cannot be deliberately undone, in any manner similar to the way in which one can trace back a line of thought--as well as lack of associativity--putting one's finger in cold water and then hot does not lead to the same two temperature percepts which are achieved, in reverse order, by putting it first in hot and then in cold.

Some additional bits of evidence bearing on the perception/cognition distinction can be gleaned from the classical experimental areas of learning and motivation, particularly with respect to the operation of "set" and "satiation" mechanisms. However, let us instead return to linguistics and see if what has been said makes any sense. In terms of phonology, it is clear that the sounds of language can themselves become the objects of cognition--or otherwise we would not have an area of phonology to worry about. Usually though, little cognitive notice is taken of the sounds of any utterance, and they are utilized perceptually, while cognitive operations are being directed toward dealing with the message. Now if Brunswik's characterization of perception holds in general, the extremely messy relation between acoustic cues and phonological distinctive features that has been described by investigators like Delattre (1967) should, unfortunately, be expected--if we have nine perceptual cues available for visual distance, why shouldn't there be several spectrographic characteristics, rather than a single criterial one, involved in perceiving voicing? Likewise, given interdependence as a primary property of perception, one would expect the extreme amount of influence of contiguous sound units that one in fact does find described in increasingly more comprehensive phonologies.

On the other hand, one might expect considerable divergence between phonological and semantic descriptions. As rules governing the cognitive activity of the linguist, one should be able to characterize both areas by Boole's "Laws of Thought;" but as structures describing the phenomena themselves, the "laws of thought" involved in semantics may well turn out quite differently from "laws of perception" embodied in phonology. Of course there is a good deal of wisdom as well as comfort in assimilating the unknown (in this case, semantics) to the better known (in this case, phonology). Certain basic descriptive terms like "feature," "marked/unmarked," and "rule" may well be useful in both areas. But my point is that the linguist may well expect not find strict isomorphism between rules in the two areas.

A crucial question is one which has been carefully avoided until now: where does syntax fit into the picture. At first blush, a syntax portion of a grammar seems to come into being by virtue of the fact that there is such an obvious gap between phonology (what is heard) and semantics (what is understood). It turns out, however, that most performance models for syntax quite unabashedly use perceptual terms, tasks, or paradigms--or all three. This holds for Lashley's (1951) perceptual-motor schemas, Osgood's (1957) integrative tuning mechanism, Epstein's (1961) chunking device, and Garrett, Bever & Fodor's (1966) active perceiver. Possible

exceptions are Yngve's (1960) mechanism, which, although it leans toward what appears to be perceptual features in Miller's "magical number seven," does maintain what I take to be a studied neutrality; and Miller's (1962) schema-plus-correction, although it is derived from Woodworth's discussion of chiefly perceptual data. This predominance of perceptual models seems unfortunate, insofar as the syntactic data themselves appear to involve far greater independence of components and preservation of nature under re-ordering than one would have expected. More recent attempts to base syntactic analyses on criteria derived from semantic naturalness seems to be a promising corrective. In this connection Piagetian description of cognitive structure in terms of networks is interesting. Lack of time and ignorance restrain me from going further into this most fascinating topic.

Lastly, let us consider the developmental features of the perception/cognition dichotomy. This is of course one of Piaget's main concerns, and divergence of perceptual and cognitive development is probably the strongest evidence for their separation. His own investigations of the development of cognition in the child are well known (*cf.* Flavell, 1963). Less well known, but equally well-founded is his own and others' documentation of perceptual development. These perceptual changes with age do not merely involve increases in veridicality, but alterations in the nature of perceptual activity, as is

evident from reactions to presentations of the same perceptual material in company with changing contextual cues. The changes do not seem to involve new forms of perceptual organization (in the sense that concrete and formal operations appear in cognition). The most general perceptual trend is one from a general unanalyzed reaction to a general, unanalyzed situation (which may be called pyhsiognomic perception) toward greater differentiation of both stimulus and response. The amount of perceptual development actually causes trouble for classical empiricist formulations, which have usually taken perceptual data too much for granted.

The present picture of the infant then is not one of an organism who perceives like an adult, but merely lacks certain additional cognitive operations; rather it is one of a person whose operations on input are best characterized as intermediate between the perceiving and cognizing of adults. Insofar as this is true, the child, in acquiring language is making neither the semantic nor the phonological judgments of an adult. His task in structuring the language he hears and produces is not primarily that of associating adult sound-percepts with adult meaning-concepts, but separating language material (as "stuff" for developing perceptual operations) from language meaning (in the functioning of developing cognitive operations).

This view of early perceptual/cognitive operations in childhood serves as a basis for Werner & Kaplan's (1963) assertion that the young child makes roughly the same sort of physiognomic reactions to language as to the things language comes to represent for him. Language acquisition, then, takes place by utilizing the considerable overlap between "perceptual/cognitive" reactions to what will be the language material on the one hand and to what will be represented by it on the other. Only later in development does the child come to respect the asymmetry which takes sounds as the "neutral" perceptual matter in order to transmit messages about states of affairs (rather than vice versa). This opinion leads to a rather specific and unusual interpretation of the statement that the child is a "natural language scientist"--he is one because he has not learned the importance of the cognitive unimportance of language material in communication.

The question of perceptual/cognitive factors comes up again in connection with syntax acquisition. This matter has recently been discussed from a slightly different point of view (Hass, 1968). Here it will suffice to note that many transformations are interpretable as being cued off by semantic markers whose inclusion is determined by the communicative roles involved in the speaker-hearer dyad, so that syntactic development may reflect the development of social-cognitive competence.

In conclusion, I hope to have called your attention to a basic split between perception and cognition that we as psychologists or linguists tend, at least at some times, to make either explicitly or implicitly. There is some psychological evidence, although certainly not a great deal, to substantiate, at least for higher developmental levels, the functional importance of the split. The chief problems for psycholinguistics which arise out of it are: how to know when to resist the pressure toward isomorphic descriptions of aspects of language which lie at different places relative to perception/cognition, and how to deal with the relation between development in both kinds of operations and the nature of language development. The day is not at hand when specific information on the form of linguistic descriptions can be gained from psychological principles, but movement in that direction (from the ad hoc proposals exemplified in the above) can be undertaken.

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